

5 hominid from the Sima de Los Huesos site in Spain, and the Browns Valley cranium from Minnesota.

The bulk of the book flows smoothly, and there is a great wealth of information that is covered in both visual and written format. While this is not a substantial revision of the second edition, the authors have done a good job of keeping the reader up to date. The information presented is succinct without being overwhelming, and Larsen et al. largely accomplished what they set out to do. I would add only a few suggestions.

Although the authors state that it is their intention to instruct the student in the phases of human evolution, there is an almost scrupulous absence of phylogenetic information regarding these fossils throughout this volume. As an added bonus for students, a section on how the different stages of hominid evolution are thought to fit together would be much appreciated in a future edition.

Additionally, while the authors' stated purpose is to include only the most complete specimens available, there is a danger in doing so. Very often, morphological variability in sites with multiple specimens is glossed over. This is especially true for the Skhul crania, where the three most complete crania, Skhul IV, V, and IX, are ex-

remely diverse morphometrically. More information about the skeletal variability at sites with multiple hominid remains would be helpful.

A third quibble is that because there is no partition between the Upper Pleistocene and Holocene modern *Homo sapiens*, there is a disruption in the flow of the chronological narrative. On occasion, specimens that are integral to the emergence of anatomically modern humans are grouped with specimens that are more recent in time (e.g., Jebel Qafzeh 6 and Lo. 4b) and which represent a very different part of the evolutionary picture. It might be more useful to subdivide modern *Homo sapiens* into an early and late group, as is done with archaic *Homo sapiens*.

These items aside, this is a very worthwhile addition to any library on human evolution and would, as the authors hope, serve as a good supplementary text. The authors have accomplished many of the goals they stated in the preface and have provided an enlightening, instructive book that yields much valuable reference information.

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HUMAN DENTAL DEVELOPMENT, MORPHOLOGY, AND PATHOLOGY—A TRIBUTE TO ALBERT A. DAHLBERG. Edited by John R. Lukacs. 1998. Eugene: University of Oregon Anthropological Papers (Number 54). 447 pp. ISBN 0-87114-060-8. \$39.95 (paper).

From Yanomamo oral health and the effects of tobacco smoke on prenatal dental asymmetry to the dental morphology of Bronze Age Bactrians and the forensic implications of Carabelli's trait, this volume illustrates the variety and depth reflective of Albert A. Dahlberg's career. The foundation for this volume originated at a special symposium of scholars at the 1995 American Association of Physical Anthropology meetings in Oakland, California, where the Albert A. Dahlberg Memorial Symposium on Dental Morphology and Evolution was cosponsored by the Dental Anthropology Association. The contents of this monograph closely parallel the symposium and graciously display, according to Lukacs' preface, "... a direct measure of Al Dahlberg's contributions and the magnitude of his influence on this field of research." These contributors, many of whom collaborated with Dahlberg, represent many of today's international leaders in dental research. Their perspectives include new initiatives and continuations of long-established

of scholars at the 1995 American Association of Physical Anthropology meetings in Oakland, California, where the Albert A. Dahlberg Memorial Symposium on Dental Morphology and Evolution was cosponsored by the Dental Anthropology Association. The contents of this monograph closely parallel the symposium and graciously display, according to Lukacs' preface, "... a direct measure of Al Dahlberg's contributions and the magnitude of his influence on this field of research." These contributors, many of whom collaborated with Dahlberg, represent many of today's international leaders in dental research. Their perspectives include new initiatives and continuations of long-established

lished research projects that are as much about dental biology from the epidemiological and clinical setting as they are true to the traditional tenets of dental anthropology. Twenty chapters are arranged in five sections that exemplified Dahlberg's interests: dental development and genetics (three chapters), morphological variations (eight chapters), odontometric variation (five chapters), dental pathology and attrition (three chapters), and a concluding paper on the history of dental anthropology.

Robert Corruccini, Simon Hillson, and John Mayhall are names long synonymous with exploring quantitative and qualitative approaches to the epithelial-mesenchymal nuances underlying coronal morphological variation. Eschewing the "New Morphometrics" (Dean, 1994), Corruccini brings phylogenetic concerns due attention to Dahlberg's early interests in dental ontogeny of primate mandibular molars. Fueling the paleontological interest in perikymata, Hillson examines the relationship between crown diameters, crown development, and environmental factors by exploring four main theories of how environmental factors may disrupt amelogenesis and affect surface contour. Based on their long-term Finnish studies of the effects of sex chromosomes on maxillary first molar cusps, Mayhall, Alvesalo, and Townsend three-dimensionally assess the effects of an additional sex chromosome (47,XYY), using fringes (contours) from moiré contourgraphic techniques in measures of cuspal area, volume, shape, and linear dimensions.

Reflecting Dahlberg's main interest in teeth (the traditional emphasis in dental anthropology), coupled with the editor's own research domain, studies in morphological variation quite naturally comprise the bulk of this volume. These contributions represent a who's-who in studies of prehistoric and historic dental coronal variation. The works in this section include not only routine metric and nonmetric characteristics, but also studies of root and accessory root structures and even forensic considerations.

Even though the precise mechanism of

inheritance is poorly understood, the micro-evolutionary implications derived from metric and nonmetric studies of dental morphological variation have proven the most intriguing and fruitful area of research in dental anthropology. From Dahlberg's specific collaborations with Christy Turner, John Lukacs, and Richard Scott and those influences upon Brian Hemphill, Joel Irish, Anne Haeussler, and Guy Tasa and their students, quantitative approaches to morphological variation and population history are most popular.

Perhaps nowhere in dental anthropology is Dahlberg's influence more visible than in the research designs forged through his association with the development of dental anthropology at Arizona State University. Lukacs, Hemphill, and S.R. Walimbe examined 17 traits among three contemporary Indian groups to ascertain if the low-caste Mahars are indigenous inhabitants of Maharashtra. Lukacs' long-term "dental morphology as population history" in South Asia is undoubtedly one of the most sterling examples of this most traditional realm of dental anthropology. Hemphill, along with A.F. Christensen and S.I. Mustafakulov, assess the biological adaptations and affinities from Bronze Age Bactria compared to Indus Valley samples, while Haeussler's prehistoric Russian research pinpoints the origins and relationships of peoples from large Ukrainian Mesolithic Era cemeteries. Irish's Nubian research uses dental morphology to assess population continuity and discontinuity among paleolithic Nubians.

Using metric and nonmetric dental variations among major human populations, Hanihara attempts to sketch the origin of modern humans from the emergence of various extant dental patterns. He supports a single-origin hypothesis from sub-Saharan Africans, noting that they have fewer derived features than any other group. Alexandersen and Carlsen provide a detailed descriptive morphological survey of their research on the "quasi-continuous" development of entomolar and paramolar supernumerary roots in mandibular molars from a

large extracted sample of Danish and comparative Greenlandic Inuit. Tasa illustrates how some related traits in mandibular third molars can be applied to hypothesize peopling of the New World and Oregon during prehistory. Turner and Hawkey, in an assessment of 29,000 individuals from 15 "geogenetic" regions, sternly warn us about our traditional reliance on Carabelli's trait in forensic odontological as an indicator of European ancestry.

Ed Harris, Julius Kieser and Hennie Groeneveld, Yuji Mizoguchi, Donald Morris, and Grant Townsend and Victoria Farmer provide research on the sister disciplines of odontometric variation and dental asymmetry in various populations. Using a principal component analysis, Harris examines the patterning of covariation in the developmental and intraspecific odontometric relationships of human tooth size. In an interesting departure, Kieser and Groeneveld look at developmental aspects of fluctuating dental asymmetry, following prenatal exposures to tobacco smoke. Mizoguchi uses principal component analysis to isolate the "concrete factors" affecting the morphogenesis of deciduous teeth, and thus to examine their size and covariation-variation. Townsend and Farmer explore asymmetry in the deciduous dentition of South Australian children, using Euclidean distance measures to assess both fluctuating and directional asymmetry in relation to sex, birth weight, and tooth class. Finally, Morris shows that his method of occlusal polygon measurements systematically captures angular and linear variation between antimeres.

One of the most interesting contributions in the book is Walker, Sugiyama, and Chacon's oral epidemiological/ethnobiocultural study of diet, dental health, and culture change among recently contacted South American Indian hunter/horticulturalists. The role and perspectives of the dental anthropologist in a multidisciplinary team approaching the dietary and cultural problems of a threatened people reveal a medical anthropological contribution, besides forcing some reevaluations of our bioarchaeologi-

cal accounts. Cucina and Iscan successfully illustrate the interpretive value that teeth provide in bioarchaeological interpretations of adaptation from oral pathological data of Archaic Florida Indians. In an examination of teeth from prehistoric St. Thomas, U.S. Virgin Islands, Larsen, Teaford, and Sandford provide one of the best comparative frameworks for examining the worldwide incidence of extramasticatory tool use in anterior teeth for plant processing. Their exquisite electron micrographs reveal a more varied pattern of manioc horticultural processing than previously considered. Brown's historical account on a century of dental anthropology in South Australia at Adelaide University highlights, among other things, the longitudinal study of morphology, occlusion, and craniofacial growth among Aborigines in Central Australia on the Yuendumu Reserve. While still reanalyzing much of his original data, Brown also describes a shift in emphasis from an Aboriginal focus to other groups. He and others are currently concentrating on twin studies, chromosomal anomalies, and craniofacial imaging for surgical evaluations.

This volume clearly illustrates the pulse of current dental anthropological research from the traditional to the applied and clinical in a reference-rich, affordable edition. Reflecting upon the international development of dental anthropology in this century and the contributions of Albert Dahlberg, in a most unique and impressive manner, Lukacs' volume captures the broad global influence on so many areas of dental research today. Undoubtedly, as expressed by Richard Scott in his dedication of the volume to Albert A. Dahlberg, "His 85 years were well spent."

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